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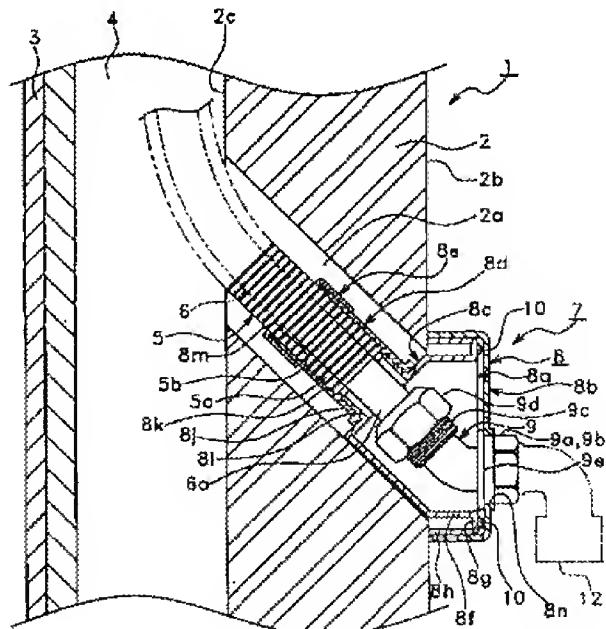
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(54) (TITLE OF THE INVENTION) Plumbing Structure and Plumbing Method for Liquid Supply Pipe

(57) (ABSTRACT)

(PROBLEM) To provide a plumbing structure for liquid-supply pipes whereby ingress of rainwater to inside the outer walls can be prevented while providing a passage hole in the outer walls of buildings.

(MEANS FOR SOLVING) A plumbing structure 7 wherein a liquid supply pipe 6 inserted into a sheath tube 5 and plumbed inside an outer wall 2 is made to face toward the outside of the outer wall 2, which comprises the aforementioned liquid supply pipe 6, the aforementioned sheath tube 5, a passage hole 2a, a liquid supply box 8 and a joint 9. The passage hole 2a is formed at an inclination so that it is directed upwards in the eternal wall 2 as it passes from the outer surface 2b to the inner surface 2c, thereby making ingress of rainwater difficult. The liquid supply box 8 is attached so that it covers the passage hole 2a on the outside of the outer wall 2, and is connected to one end 5a of the sheath tube 5 via the passage hole 2a. The joint 9 is housed inside the liquid supply box 8, and a first connecting nut 9b on one end of the end 9a faces toward the outside of the outer wall 2, whereas the other end 9c is connected to one end 6a of the liquid supply pipe 6 by a second connecting nut 9d.



(SCOPE OF PATENT CLAIMS)

(CLAIM 1) A plumbing structure wherein a flexible liquid supply tube inserted in a flexible sheath tube and plumbed inside an outer wall of a building is made to face toward the outside of said outer wall, said liquid supply tube plumbing structure characterized in that it comprises:

said liquid supply tube;

said sheath tube;

a passage hole that is drilled at an incline in said outer wall so that it is directed upwards as it passes from the outer surface to the inner surface thereof;

a liquid-supply box that is attached to said outer wall so that it covers said passage hole on the outside of said outer wall and also connects to one end of said sheath tube via said passage hole; and

a joint that is housed inside said liquid-supply box, with one end facing toward the outside of said outer wall and the other end disposed on one end of said sheath tube and connected to one end of said liquid supply tube.

(CLAIM 2) The liquid supply tube plumbing structure according to Claim 1, wherein the other end of said liquid supply tube is connected to a branching header that is disposed at a higher level of said building.

(CLAIM 3) A liquid supply tube plumbing method wherein a flexible liquid supply tube inserted in a flexible sheath tube and plumbed inside an outer wall of a building is made to face toward the outside of said outer wall, said liquid supply tube plumbing method characterized in that it:

provides a passage hole that is drilled at an incline in said outer wall so that it is directed upwards as it passes from the outer surface to the inner surface thereof;

pulls, outwards from said outer wall, said sheath tube that has been plumbed inside said outer wall via said passage hole;

connects the box main body of the liquid-supply box that can house the joint to one end of said sheath tube, pushing back said sheath tube into said outer wall, and attaching said box main body to said outer wall so as to cover said passage hole on the outside of said outer wall, then, inserting said liquid supply tube into said sheath tube, while making one end of said liquid supply tube protrude outwards from said outer wall from the front surface of said box main body, positioned to one end of said sheath tube; and

connects said joint to one end of said liquid supply tube, inserting said liquid supply tube into said box main body, and housing said joint inside said liquid-supply box.

(DETAILED DESCRIPTION OF THE INVENTION)**(0001)**

(TECHNICAL FIELD OF THE INVENTION) This invention relates to a liquid supply tube plumbing structure and plumbing method, wherein a liquid supply tube that is plumbed inside the outer wall of a building is made to face toward the outside of the outer wall.

(0002)

(PRIOR ART) A conventional plumbing structure in which a liquid supply tube is plumbed along a wall and into the interior of the wall is presented in Japanese Examined Patent Application Publication H6-15912, which provides a double-plumbing structure comprising a sheath tube and a liquid supply tube that inserts into this sheath tube. This

plumbing structure 21, as shown in Fig. 9, is configured from a liquid supply tube 22, a sheath tube 23, a passage hole 24a drilled into a wall 24, a liquid-supply box 25 and a joint 26. In this configuration, the passage hole 24a is drilled in the same direction as the width of the wall 24, that is, in a direction perpendicular to the wall surface. Thus, the liquid-supply box 25 is situated so that one side 25a face toward the outside of the wall 24 and the other side 25b is plumbed along the wall 24 on the inside of the wall 24. A sheath tube 23 is connected to the other side 25b. The joint 26 is housed inside the liquid-supply box 25, where one end 26a faces toward the outside of the wall 24 and the other end 26b is connected to the liquid supply tube 22 that has been inserted into the sheath tube 23.

(0003) When the joint 26 is housed inside the liquid-supply box 25 in this plumbing structure 21, initially, one end 22a of the liquid supply tube 22 is pulled outwards from the wall 24 as shown in Fig. 10. Next, the other end 26b of the joint 26 is connected to one end 22a of the liquid supply tube 22 that has been pulled out, and the liquid supply tube 22 is then inserted into the liquid supply box 25 and sheath tube 23 so that the joint 26 is housed inside the liquid-supply box 25.

(0004)

(PROBLEMS TO BE SOLVED BY THE INVENTION) In this connection, when the conventional plumbing structure 21 is utilized for an outer wall, an insertion opening 24a is drilled in the outer wall, so there is the danger that rain water will enter from outside the building via this passage hole 24a.

(0005) In addition, when an outer wall is composed of ALC panel (normally having a thickness of about 75 mm to 100 mm) and thus the wall is thick, the liquid supply tube 22 will bend sharply in the region in which it inserts into the passage hole 24a from the interior of the outer wall. As a result, when the joint 26 is housed inside the liquid-supply box 25, it will be difficult to carry out the operation in which this liquid supply tube 22 is pulled outwards from the outer wall or inserted into the liquid-supply box 25, and it is believed that the liquid supply tube 22 could buckle in some cases.

(0006) This invention was designed in order to resolve the above conventional disadvantages, and an objective thereof is to provide a liquid-supply pipe plumbing structure and method whereby ingress of rain water into the outer wall can be prevented in a plumbing structure in which a liquid supply tube is plumbed inside the outer wall of a building and faces toward the outside of this exterior wall.

(0007) Another objective of the present invention is to provide a liquid supply tube plumbing structure and plumbing method whereby, during installation, the liquid supply tube withdrawal and insertion operations whereby the liquid supply tube is pulled outwards from the outer wall or inserted into the liquid-supply box are made easier.

(0008)

(MEANS FOR SOLVING THE PROBLEMS) With the aim of attaining the objectives described above, the liquid-supply pipe plumbing structure and plumbing method pertaining to the present invention have the configurations described below. Specifically, the liquid supply tube plumbing structure pertaining to the present invention described in

(3)

Claim 1 is a plumbing structure in which a flexible liquid supply tube is inserted into a flexible sheath tube and is plumbed inside an outer wall of a building, facing toward the outside of the aforementioned outer wall. The plumbing structure comprises the aforementioned liquid supply tube, the aforementioned sheath tube, a passage hole and a liquid-supply box. The passage hole is drilled at an incline so that it is directed upwards as it passes from the outside to the inside of the aforementioned outer wall. The liquid supply box is attached to the aforementioned outer wall so that it covers the aforementioned passage hole in the outside of the aforementioned outer wall, and is connected to one end of the aforementioned sheath tube via the aforementioned passage hole. The joint is housed in the aforementioned liquid-supply box, and one end faces toward the outside of the aforementioned outer wall, whereas the other end is connected to one end of the aforementioned liquid supply tube that is disposed at one end of the aforementioned sheath tube.

(0009) In this manner, it is possible for liquid to be conducted from outside an outer wall to inside the outer wall and from inside the outer wall to outside the outer wall, because the liquid supply tube that is inserted into the sheath tube and is plumbed inside the outer wall faces toward the outside of the outer wall via a joint that connects to one end of the liquid supply tube through a passage hole that is drilled in the outer wall. At this time, the passage hole is drilled at an incline so that it is directed upwards as it passes from the external surface to the internal surface of the outer wall. Consequently, if rain water should enter into the passage hole, the rain water will be directed downward and will flow towards the outside surface of the outer wall to be discharged outwards. In addition, because the passage hole is drilled at an incline in this manner, the angle at which the inner surface of the outer wall on the upper side of the passage hole meets the passage hole is an obtuse angle. Consequently, the liquid supply tube bends smoothly in the region where it is inserted into the passage hole from inside the outer wall during the operation in which the liquid supply tube is inserted into the liquid-supply box or pulled outwards from the outer wall during connection of the joint to the liquid supply tube when plumbed from the top side of the passage hole. The connection region between one end of the sheath tube and the liquid-supply box may be inside the passage hole or may be outside or inside the wall, having exited the passage hole. Similarly, the connection region between one end of the liquid supply tube and the other end of the joint may be inside the passage hole or may be inside or outside the outer wall, having exited from the passage hole.

(0010) In addition, according to the liquid supply tube plumbing structure of the invention described in Claim 2, the other end of the aforementioned liquid supply tube may be connected to a branching header disposed at a higher level in the aforementioned building. Because the other end of the liquid supply tube is connected to the branching header disposed at a higher level in the building in this manner, the liquid supply tube is conducted through the interior of the outer wall from the top side of the passage hole, and, as described above, the liquid supply tube bends smoothly in the region in which it inserts from the inside of the outer wall into the passage hole in the operation in which the liquid

supply tube is pulled out from the outer wall or inserted into the liquid-supply box. In addition, because the other end of the liquid supply tube is connected to the branching header, the liquid that is conducted from outside the outer wall by means of this liquid supply tube is supplied to respective locations as a result branching at the branching header. Conversely, liquid that has been branched at the branching header can be supplied outside the outer wall by means of this liquid supply tube.

(0011) In the invention according to Claim 3, the liquid supply tube plumbing method is a plumbing method in which a flexible liquid supply tube that is inserted into a flexible sheath tube and is plumbed inside the outer wall of the building is plumbed so that it faces toward the outside of the aforementioned outer wall, where plumbing is carried out in the following sequence.

(0012) 1) A passage hole is drilled at an incline so that it is directed upwards as it passes from the outside surface to the inside surface of the aforementioned outer wall.

(0013) 2) One end of the aforementioned sheath tube that is plumbed inside of the aforementioned outer wall is pulled to the outside of the aforementioned outer wall via the aforementioned passage hole.

(0014) 3) The box main body of the liquid-supply box that can house the joint is connected to one end of the aforementioned sheath tube, the aforementioned sheath tube is inserted back into the aforementioned outer wall, and the aforementioned box main body is attached to the aforementioned outer wall so that it covers the aforementioned passage hole on the outside of the aforementioned outer wall.

(0015) 4) The aforementioned liquid supply tube is then inserted into the aforementioned sheath tube, and, along therewith, one end of the aforementioned liquid supply tube that is disposed at one end of the aforementioned sheath tube is pulled out of the aforementioned outer wall from the front surface of the aforementioned box main body.

(0016) 5) The aforementioned joint is connected to one end of the aforementioned liquid supply tube, and the aforementioned liquid supply tube is inserted into the aforementioned box main body so that the joint is housed inside the aforementioned liquid-supply box.

(0017) According to the above plumbing method, the passage hole is drilled at an incline so that it is directed upwards as it passes from the outside to the inside of the outer wall. Should rain water enter into the passage hole, the rain water will flow downwards along the passage hole, that is, to the outside of the outer wall, thus being discharged outwards. In addition, because the passage hole is drilled at an incline in this manner, the passage hole and the inner surface of the outer wall on the upwards side of the passage hole form an obtuse angle. Consequently, when the liquid-supply pipe is plumbed from the top side of the passage hole through the interior of the outer wall, the liquid supply tube bends smoothly in the region in which it inserts from the inside of the outer wall into the insertion hole in the operation in which the liquid supply tube is pulled out from the outer wall or in the operation in which the liquid-supply tube is inserted into the liquid-supply box, in steps (4) and (5) above.

(0018)

(EMBODIMENT OF THE INVENTION) The liquid supply tube plumbing structure and method pertaining to the present invention are described below in reference to the figures.

(0019) Figs. 1 to 8 show embodiments of the liquid supply tube plumbing structure and method pertaining to the present invention. Figs. 1 and 2 show an embodiment of the liquid supply

tube plumbing method, where 1 in the figure is a building, 2 is an outer wall that serves as the outside wall of the building 1, 3 is an inner wall that serves as the walls of the room interiors, 4 denotes the space in the walls that is formed between the outer wall 2 and internal wall 3, 5 is a flexible sheath tube, 6 is a flexible liquid supply tube that is inserted into the sheath tube 5, runs along the outer wall 2 of the building 1, and is plumbed in the wall interior space 4 on the inside of the outer wall 2. 7 is the plumbing structure whereby the aforementioned liquid supply tube 6 faces toward the outside of outer wall 2 and consists of the aforementioned liquid supply tube 6, the aforementioned sheath tube 5, a passage hole 2a, a liquid supply box 8 and a joint 9.

(0020) The wall 2 is composed, for example, of ALC panel with a thickness of from 75 mm to 100 mm. The liquid supply tube 6 is crosslinked polyethylene resin. Although it is flexible, it is relatively rigid, and is thus difficult to bend around sharp curves.

(0021) The passage hole 2a is drilled at an inclination in a direction that is angled at 45° from the horizontal so that it is directed upwards as it moves from outer surface 2b to the inner surface 2c of the outer wall 2.

(0022) The liquid-supply box 8 is composed of a box main body 8a and a cover 8b. In addition, the box main body 8a is composed of a main body member 8c that houses the joint 9, a sheath tube attachment member 8d into which the sheath tube 5 inserts and a stopper 8e that stops the inserted sheath tube 5. The main body member 8c has a rim-shaped part 8f that is formed in the shape of a rim so as to house the joint 9. This rim-shaped part 8f is disposed such that it lies against the passage hole 2a and [protrudes out towards] the outside of the outer wall 2. From the front end of the rim-shaped part 8f that serves as the outside of the outer wall 2, a front surface part 8g is formed that extends so that the front surface profile is in a rectangular shape, bending at a right angle at the external circumference across the entire periphery of the rim-shaped part 8f. In addition, a side part 8h is formed that bends at a right angle and extends so that it reaches from the circumferential edge of the front surface part 8g to the outer surface 2b of the outer wall 2. An attachment hole (not shown) is drilled in the front surface part 8g, and, by means of fixing fixtures 10, 10 such as screws, the box main body 8a that contains this main body member 8c is attached to the outer surface 2b of the outer wall 2 such that it covers the passage hole 2a on the outside of the outer wall 2. In addition, a cylindrical attachment part 8i that constricts to produce a smaller diameter from the rear end of the rim-shaped part 8f is formed.

(0023) The sheath tube attachment member 8d is formed in the shape of a cylinder, and the part to be attached 8j of the aforementioned end section fits into the attachment part 8i of the main body member 8c such that they engage. Thus, from the center to the back end section of the sheath tube attachment member 8d, a sheath tube insertion part 8k is produced into which one end 5a of the sheath tube 5 inserts.

(0024) The stopper 8e is formed in the shape of a cylinder such that it covers the external circumference of the rear end portion of the sheath tube attachment member 8d, and is attached to the rear end portion of the sheath tube attachment member 8d by means of adhesion or press-fitting or the like. The locking fixture 8e extends such that it is folded backwards to the inside from the sheath tube attachment member 8d, and fastening protrusions 8m are formed that protrude towards the center at the extended distal end. The fastening protrusions 8m fit into grooves 5b of the sheath tube 5 that has been inserted into the sheath tube attachment member 8d, and one end 5a of the sheath tube 5 attaches to the sheath tube attachment member 8d via the stopper 8e.

(0025) In addition, the cover 8b is formed in the shape of a box so as to cover the front surface part 8g and side part 8h while blocking the front end side of the rim-shaped part 8f of the box

main body 8a. Thus, an opening hole 8n through which a first connection nut 9b of the joint 9 described below inserts is formed on the front surface of the cover 8b.

(0026) The liquid-supply box 8 is thus attached to the outer wall 2 such that it covers the passage hole 2a on the outside of the outer wall 2, while also connecting to one end 5a of the sheath tube 5 via the passage hole 2a.

(0027) The joint 9 has a cylindrical shape with a curved middle section. A first connection nut 9b used for connection is formed on one end 9a, and a second connection nut 9d for connection is similarly provided on the other end 9c. In addition, a flange part 9e that extends to both sides thereof is formed on the base end section of the first connection nut 9b. This joint 9 is housed inside the frame part 8f of the box main unit 8a and the flange part 9e is fixed to the front surface part 8g of the box main unit 8a by means of fixing fixtures 11, 11 such as counter-sink head screws, thereby attaching it to the box main unit 8a. Thus, the distal end portion of the first connection nut 9b on one end 9a of the joint 9 is made to protrude from the opening hole 8n of the cover 8b, facing toward the outside of the outer wall 2. The other end 9c of the joint 9 connects, by means of a second connection nut 9d, to one end 6a of the supply tube 6 that protrudes from the sheath tube 5 situated towards one end 5a of the sheath tube 5. In this manner, the liquid supply tube 6 faces toward the outside of the outer wall 2 via the joint 9, and, for example, an elbow 12 or the like is connected to the first connection nut 9b of one end 9a of the joint 9, thereby leading to lines present on the outside of the outer wall 2.

(0028) Fig. 3 shows an example of the above plumbing structure in which a branching header is used, and water is supplied to various parts of the building 1. 13 in the figure denotes the space inside the ceiling between the ceiling of the first floor and the floor of the second floor. 14 denotes a water line external to the room, 15 denotes a branching header, and 16 denotes a hot water heater that is installed outside the room. Regarding the plumbing structures 7, one is a structure in which a water line 14 outside the room is connected to the branching header 15 that is disposed in the space 13 in the ceiling of the room, and the other is a structure in which the hot water heater 16 outside the room is connected to the branching header 15. In these plumbing structures 7, 7, the liquid supply tubes 6, 6 are disposed above the passage hole 2a through the space 4 inside the walls on the inside of the outer wall 2, and the other ends 6b, 6b of the liquid supply tubes 6, 6 are connected to the branching header 15 that is installed towards the upper level of the building 1.

(0029) In this manner, water that is supplied from the water line 14 is conducted to the branching header 15 via one plumbing structure 7, and the water is then branched at the branching header 15 and is conducted to the external hot water heater 16 via another plumbing structure 7. Next, the hot water exiting the hot water heater 16 is conducted into the room via another plumbing structure 7 not shown in the figures.

(0030) The method for plumbing the liquid supply tube 6 of this plumbing structure 7 will be described next. First, as shown in Fig. 4, a drill 17 is used in order to make a guide hole 2d that will serve as a guide when forming the passage hole 2a in the outer wall 2 from the side of the external surface 2b. When making the guide hole 2d, first, a guide hole boring support member 18 provided with a guide part 18a that guides the drill 17 so that it advances in the prescribed direction is fixed to the outer surface 2b of the outer wall 2 using a fixing fixture 18b such as a nail. Next,

the guide hole opening support member 18 is removed from the outer wall 2 after making the guide hole 2d.

(0031) Subsequently, as shown in Fig. 5, a passage hole 2a is drilled in the outer wall 2 using an ALC core drill 19. At this point, the ALC core drill 19 is composed of a core drill part 19a for drilling the passage hole 2a and a guide drill part 19b that fits exactly with the guide hole 2d provided in a region that is farther towards the tip than the core drill part 19a. The guide drill part 19b is guided into the guide hole 2d and the passage hole 2a is drilled at an incline in the prescribed direction, specifically, in a direction that rises as it passes from the outer surface 2b to the inner surface 2c of the outer wall 2.

(0032) Subsequently, as shown in Fig. 6, one end 5a of the sheath tube 5 that runs along the outer wall 2 and is plumbed in the wall internal space 4 on the inside of the outer wall 2 in advance is passed through the passage hole 2a and pulled out from the outer wall 2. Next, the sheath tube insertion part 8k of the box main body 8a is fit onto one end 5a of the sheath tube 5 that has been pulled out, and the box main body 8a is thus connected. Then, the box main body 8a is attached to the outer wall 2 so that it covers the passage hole 2a on the outside of the outer wall 2 using fixing fixtures 10, 10 by returning the sheath tube 5 into the outer wall 2 (refer to Fig. 7).

(0033) Next, as shown in Fig. 7, as the liquid supply tube 6 is inserted into the sheath tube 5, one end 6a of the liquid supply tube 6 that is disposed on the side of the one end 5a of the sheath tube 5 is pulled out from the outer wall 2 from the front surface of the box main body 8a. The other end 9c of the joint 9 is then connected to one end 6a of the liquid supply tube 6 using a second connection nut 9d. In addition, the liquid supply tube 6 is inserted into the aforementioned box main body 8a so that the joint 9 is housed inside the rim-shaped part 8f of the box main body 8a, and the joint 9 is attached to the box main body 8a using the fixing fixtures 11, 11 (refer to Fig. 8 and Fig. 2).

(0034) Subsequently, as shown in Fig. 8, the cover 8b is fitted onto the box main body 8a. In this manner, the joint 9 is housed inside the liquid-supply box 8, and the distal end section of the first connection nut 9b of one end 9a faces toward the outside of the outer wall 2, protruding from the opening hole 8n of the cover 8b (refer to Fig. 1).

(0035) Next, the plumbing structure 7 for the liquid supply tube 6 having the above configuration and the results of working the plumbing method for the liquid supply tube 6 will be described. The liquid supply tube 6 that is plumbed along with the sheath tube 5 in the wall inner space 4 on the inside of the outer wall 2 faces toward the outside of the outer wall 2 via the passage hole 2a drilled in the outer wall 2 and via the joint 9 that is connected to one end 6a of the liquid supply tube 6. Liquid can thus be conducted from outside the outer wall 2 to the inside or, conversely, can be conducted from the inside of the outer wall 2 to the outside.

(0036) The passage hole 2a is drilled at an incline such that it is direct upwards as it passes from the outer surface 2b of the outer wall to the inner surface 2c. Thus, even if rain water enters into the passage hole 2a,

the rain water will flow downwards along the passage hole 2a, that is, towards the outer surface 2b of the outer wall 2, thereby being discharged outwards. Consequently, even though the passage hole 2a has been made in the outer wall 2, rain water can be prevented from entering into the outer wall 2.

(0037) The passage hole 2a is drilled at an incline in this manner, and thus the angle between the inner surface 2c of the outer wall 2 on the upper side of the passage hole 2a and the passage hole 2a is an obtuse angle. In the operation in which the liquid supply tube 6 is made to exit outside the outer wall 2 or is inserted into the box main body 8a of the liquid-supply box 8 when connecting the joint 9 to the liquid supply tube 6, the liquid supply tube 6 that is plumbed from the upper side of the passage hole 2a through the wall interior space 4 on the inside of the outer wall 2 is gradually curved in the section in which it is inserted from the inside of the outer wall 2 into the passage hole 2a. Consequently, even if the liquid supply tube 6 is relatively rigid, the operation involving pulling or inserting the liquid supply tube 6 whereby the liquid supply tube 6 is made to exit outside the outer wall 2 or inserted into the box main body 8a of the liquid-supply box 8 can be made easier.

(0038) In addition, even when the passage hole 2a is drilled in the same direction as the direction of the width of the outer wall 2, the effect of facilitating the operation involving pulling or inserting the liquid supply tube 6 can be expected if the diameter of the passage hole 2a is increased. However, in this case, the building frame strength of the outer wall 2 or the aesthetics will be impaired. However, as with the plumbing structure 7 pertaining to the present invention, the diameter of the passage hole 2a can be decreased by drilling the passage hole 2a at an incline, and there will be no loss of building frame strength of the outer wall 2 or aesthetics in such a case.

(0039) The present invention can be subjected to various modifications within the scope of the above embodiment. For example, the outer wall 2 may be composed of other materials in addition to ALC panels, and the thickness of the outer wall 2 may be thicker or thinner than 75 mm to 100 mm.

(0040) In addition, if the passage hole 2a is drilled at an incline such that it is directed upwards as it passes from the outer surface 2b to the inner surface 2c of the outer wall 2, this angle may be an angle other than 45°. In addition, the axial center of the passage hole 2a may be curved in the form of an arc instead of forming a straight line.

(0041) The liquid supply tube 6 that is plumbed inside the outer wall 2 can be connected to a water faucet rather than being connected to the hot water heater 16 or the water line 14 provided on the outside of the outer wall 2 via a joint 9 or the like.

(0042) In addition, the liquid supply tube 6 may be composed of resin materials other than crosslinked polyethylene resin, provided that the material is flexible.

(0043) In addition, if the liquid supply tube 6 is plumbed on the interior of the exterior wall 2, it may be plumbed so as to run along the exterior wall 2, or, for example, it may be extended in a direction that is roughly perpendicular to the outer wall 2 and into the outer wall 2 so that it can cut across

the ceiling inner space 13 in Fig. 3 and face toward the outside of the outer wall 2.

(0044)

(EFFECT OF THE INVENTION) As is clear from the description presented above, the liquid-supply pipe plumbing structure and method pertaining to the present invention has the following effects.

(0045) By means of the liquid supply tube plumbing structure according to Claim 1 having a plumbing structure in which the liquid supply tube that is plumbed on the inside of the outer wall of a building is made to face toward the outside of the outer wall, even if rain water enters into the passage hole, the rain water will flow through the passage and be discharged outwards from the outer wall. Consequently, ingress of rain water inside the outer wall can be prevented.

(0046) In addition, by means of the liquid supply tube plumbing structure according to Claim 2, in operation involving pulling and inserting the liquid supply tube whereby the liquid supply tube is pulled outward from the exterior wall during installation or the tube is inserted into the liquid-supply box, the liquid supply tube bends smoothly in the section in which it is inserted into the passage hole from inside the exterior wall, so the liquid supply tube pulling and insertion operations can be facilitated.

(0047) By means of the liquid supply tube plumbing structure and plumbing method according to Claim 3, in the plumbing method in which the liquid-supply tube that is plumbed on the interior of the exterior wall of a building is made to face toward the outside of the outer wall, even if rainwater enters into the passage hole, the rainwater will flow through the passage hole and be discharged outside the outer wall, thereby making it possible to prevent the rain water from entering into the exterior wall. In addition, when the liquid supply tube is plumbed from the upper side of the passage hole through the interior of the exterior wall, in the operation involving pulling and inserting the liquid supply tube whereby the liquid supply tube is made to exit outside the outer wall or is inserted into the liquid-supply box, the liquid supply tube curves gradually in the section in which it inserts from the inside of the exterior wall into the passage hole, and thus the operation involving pulling and insertion of the liquid supply tube can be facilitated.

Figure 2

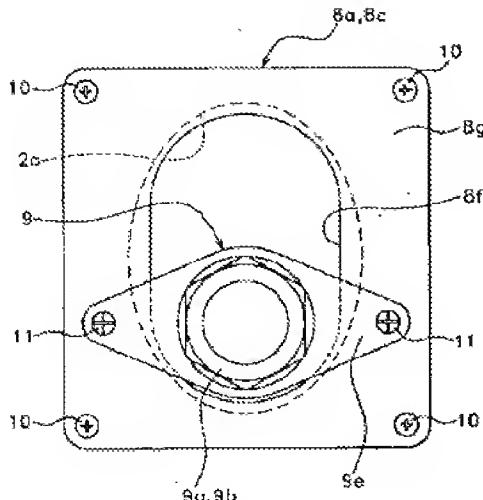
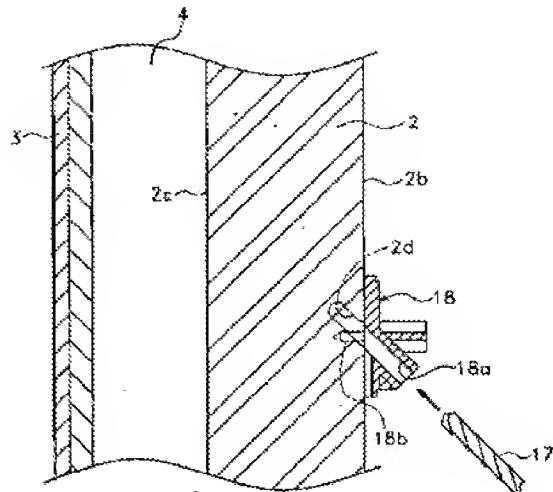


Figure 4



(BRIEF DESCRIPTION OF THE DRAWINGS)

(Fig. 1) Sectional view of an embodiment of the liquid supply tube plumbing structure and method pertaining to the present invention.

(Fig. 2) Exploded plan view of the same showing the condition in which the cover has been removed.

(Fig. 3) Sectional view of the same showing the structure of the sheath tube header.

(Fig. 4) First sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 5) Second sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 6) Third sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 7) Fourth sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 8) Fifth sectional view for describing the sequence of the liquid supply tube plumbing method.

(Fig. 9) Sectional view showing a conventional liquid supply tube plumbing structure.

(Fig. 10) Sectional view showing a conventional liquid supply tube plumbing method.

(EXPLANATION OF REFERENCES)

1	Building
2	Outer wall
2a	Passage hole
2b	Outer surface
2c	Inner surface
5	Sheath tube
5a	One end
6	Liquid supply tube
6a	One end
6b	Other end
7	Plumbing structure
8	Liquid-supply box
8a	Box main body
9	Joint
9a	One end
9c	Other end
15	Branching header

Figure 1

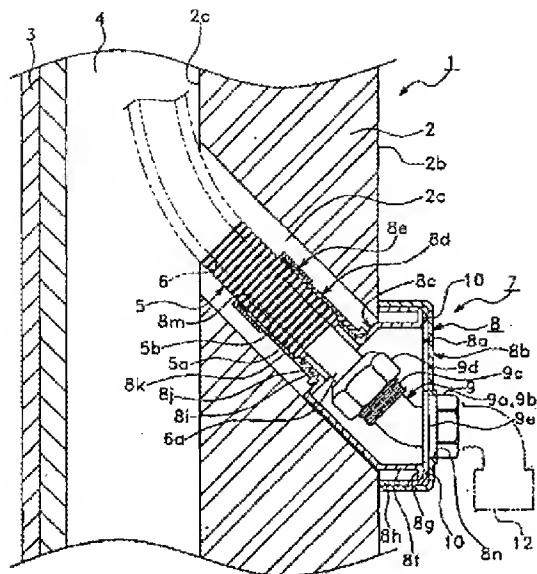


Figure 3

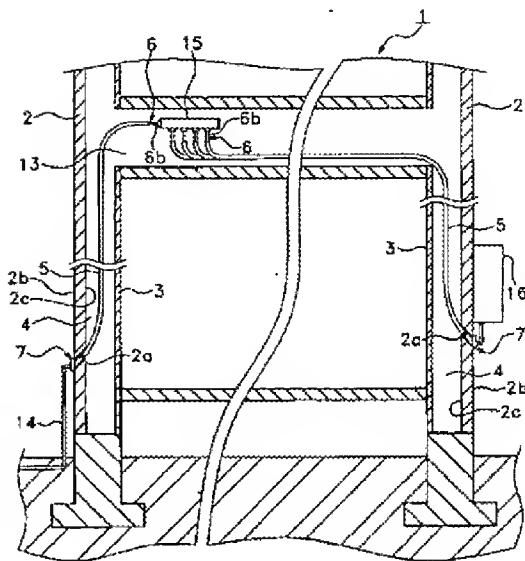


Figure 5

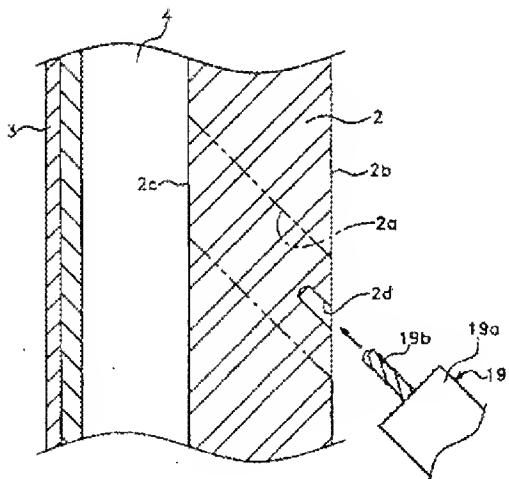


Figure 6

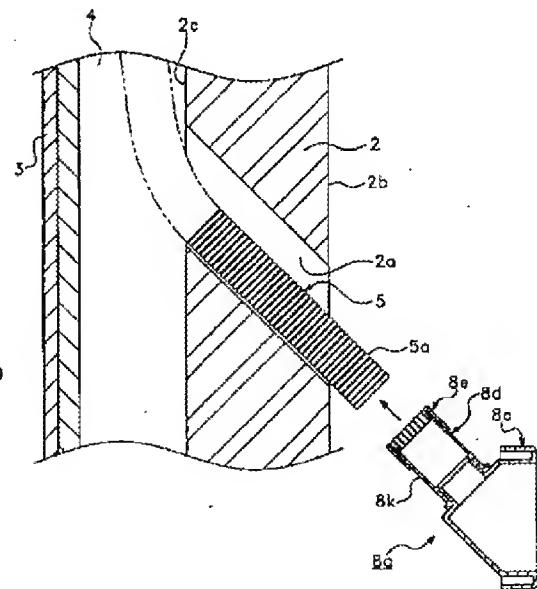


Figure 7

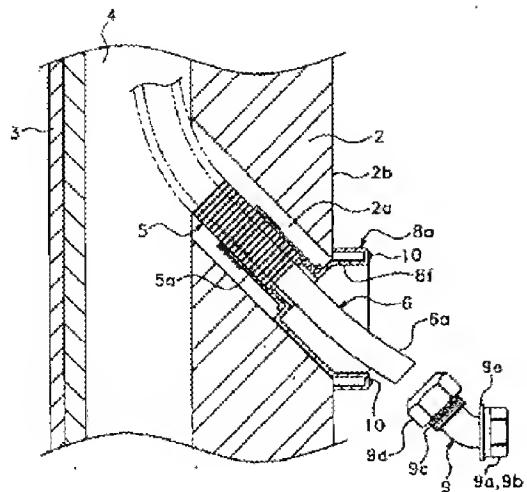


Figure 8

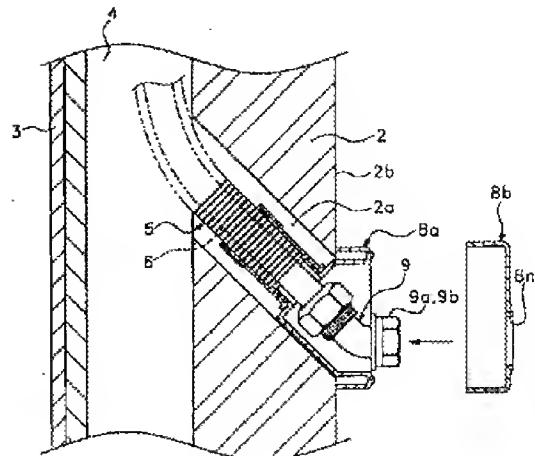


Figure 9

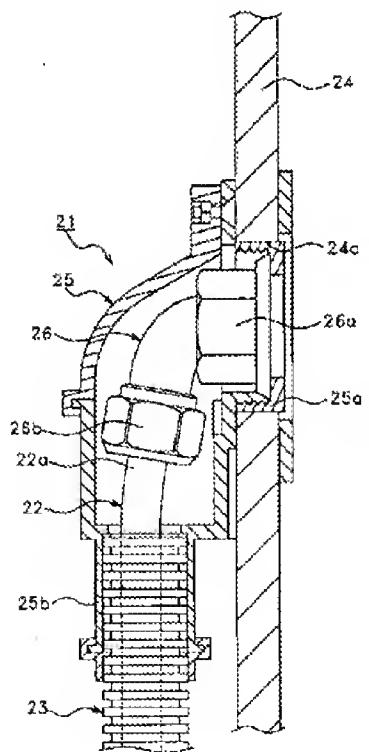


Figure 10

